

Amendments to the Claims

1. (Original) A vulcanized automotive fluid-conveying tubular structure comprising a heat tolerant, pressure resistant, hydrocarbon fluid impermeable composition containing at least one vinyl ester copolymer, wherein said vinyl ester copolymer contains greater than 40% vinyl ester based on the weight of said copolymer.
2. (Original) The tubular structure of claim 1 wherein said at least one vinyl ester copolymer contains about 60 to 90% vinyl ester based on the weight of said copolymer.
3. (Currently Amended) The tubular structure of claim 2 wherein said at least one vinyl ester copolymer is an olefin-vinyl ester copolymer ~~or a copolymer containing a first vinyl ester and a second vinyl ester.~~
4. (Currently Amended) The tubular structure of claim 3 wherein said copolymer is an ethylene-vinyl acetate copolymer ~~or a vinyl acetate-vinyl laurate copolymer.~~
5. (Original) The tubular structure of claim 4 wherein said copolymer is an ethylene-vinyl acetate copolymer.
6. (Currently Amended) The tubular structure of claim 4 wherein said composition comprises about 30 to 75% ethylene-vinyl acetate copolymer ~~or vinyl acetate-vinyl laurate copolymer~~ and about 25 to 70% one or more additives.
7. (Original) The tubular structure of claim 6 wherein said one or more additives are selected from the group consisting of process aids, fillers, plasticizers, metal oxides, metal hydroxides, peroxides, coagents, antioxidants and combinations thereof.

8. (Currently Amended) The tubular structure of claim 7 wherein said composition comprises about 45 to 60% ethylene-vinyl acetate copolymer and about 40 to 55% of one or more additives, said additives comprising;

(a) about 0.8 to 2% process aid selected from the group consisting of stearic acid, stearates, polyethylene, amines, oils, organic esters, organic phosphate esters and combinations thereof;

(b) about 20 to 60% filler selected from the group consisting of carbon black, silicon dioxide, fumed silica, precipitated silica, diatomaceous earth, magnesium carbonate, magnesium silicate, aluminum silicate, ~~silicate~~ titanium dioxide, talc, mica, aluminum sulfate, calcium sulfate, graphite, wollastonite, molybdenum disulfide, clay, calcium carbonate and combinations thereof;

(c) about 3 to 15% plasticizer selected from the group consisting of hydrocarbons, glycols, aldehydes, ethers, esters, ether-esters and combinations thereof;

(d) about 0 to 10% metal oxides and/or hydroxides selected from the group consisting of zinc oxide, zinc hydroxide, magnesium oxide, magnesium hydroxide, calcium oxide, calcium hydroxide, aluminum hydroxide and combinations thereof;

(e) about 0.5 to 2% peroxide selected from the group consisting of 2,5-dimethyl-2,5-di(t-butylperoxy)hexyne-3; 2,5-dimethyl-2,5-di(t-butylperoxy)hexane; α , α' -bis-(t-butylperoxy)-p-diisopropylbenzene; dicumyl peroxide; di-t-butyl peroxide; 1,1-bis(t-butylperoxy)-3,3,3-trimethylcyclohexane; 2,4-dichlorobenzoyl peroxide; benzoyl peroxide; p-chlorobenzoyl peroxide; 4,4-bis(t-butylperoxy) valerate; and combinations thereof; ~~thereof~~;

(f) about 0 to 5% coagent selected from the group consisting of maleimides, triallyl cyanurate, triallyl isocyanurate, diallyl terephthalate, 1,2-vinyl polybutadiene, di- and tri-functional methacrylates, diacrylates, metal ion versions thereof and combinations thereof; and

(g) about 0 to 0.3% antioxidant selected from the group consisting of phenols, hydrocinnamates, hydroquinones, hydroquinolines, diphenylamines, mercaptobenzimidazoles, and combinations thereof.

9. (Original) The tubular structure of claim 1 wherein said composition further comprises a polymeric material selected from the group consisting of ethylene-propylene-diene terpolymer (EPDM), styrene-butadiene rubber (SBR), acrylonitrile-butadiene rubber (NBR), ethylene-propylene rubber (EPR), butyl rubber, cis-polybutadiene, cis-polyisoprene, polyurethane, polyamide, and mixtures thereof.

10. (Currently Amended) A vulcanized automotive fluid-conveying tubular structure comprising an ethylene-vinyl acetate copolymer having a vinyl acetate content of about 60 to 90% based on the weight of said copolymer, said tubular structure comprising about 45 to 60% ethylene-vinyl acetate copolymer and about 40 to 55% of one or more additives, said additives comprising:

(a) about 0.8 to 2% process aid selected from the group consisting of stearic acid, stearates, polyethylene, amines, oils, organic esters, organic phosphate esters and combinations thereof;

(b) about 20 to 60% filler selected from the group consisting of carbon black, silicon dioxide, fumed silica, precipitated silica, diatomaceous earth, magnesium carbonate, magnesium silicate, aluminum silicate, silicate titanium dioxide, talc, mica, aluminum sulfate, calcium sulfate, graphite, wollastonite, molybdenum disulfide, clay, calcium carbonate and combinations thereof: thereof;

(c) about 3 to 15% plasticizer selected from the group consisting of hydrocarbons, glycols, aldehydes, ethers, esters, ether-esters and combinations thereof;

(d) about 0 to 10% metal oxides and/or hydroxides selected from the group consisting of zinc oxide, zinc hydroxide, magnesium oxide, magnesium hydroxide, calcium oxide, calcium hydroxide, aluminum hydroxide and combinations thereof;

(e) about 0.5 to 2% peroxide selected from the group consisting of 2,5-dimethyl-2,5-di(t-butylperoxy)hexyne-3; 2,5-dimethyl-2,5-di(t-butylperoxy)hexane; α, α' -bis-(t-butylperoxy)-p-diisopropylbenzene; dicumyl peroxide; di-t-butyl peroxide; 1,1-bis(t-butylperoxy)-3,3,3-trimethylcyclohexane; 2,4-dichlorobenzoyl peroxide; benzoyl peroxide; p-chlorobenzoyl

peroxide; 4,4-bis(t-butylperoxy) valerate; and combinations thereof; thereof;

(f) about 0 to 5% coagent selected from the group consisting of maleimides, triallyl cyanurate, triallyl isocyanurate, diallyl terephthalate, 1,2-vinyl polybutadiene, di- and tri-functional methacrylates, diacrylates, metal ion versions thereof and combinations thereof; and

(g) about 0 to 0.3% antioxidant selected from the group consisting of phenols, hydrocinnamates, hydroquinones, hydroquinolines, diphenylamines, mercaptobenzimidazoles, and combinations thereof.

11. (Original) A method for preparing an automotive fluid-conveying tubular structure, wherein said tubular structure comprises a heat tolerant, pressure resistant, hydrocarbon fluid impermeable copolymer composition comprising at least one vinyl ester, said method comprising: providing a copolymer comprising at least one vinyl ester wherein said copolymer contains greater than 40% vinyl ester based on the weight of said copolymer;

incorporating into said copolymer, one or more additives selected from the group consisting of process aids, fillers, plasticizers, metal oxides, metal hydroxides, peroxides, coagents, antioxidants and combinations thereof;

forming a tubular structure of said copolymer containing said additives; and
vulcanizing said tubular structure.

12. (Original) The method of claim 11 wherein said at least one vinyl ester contains about 60 to 90% vinyl ester based on the weight of said copolymer.

13. (Currently Amended) The method of claim 12 wherein said at least one vinyl ester copolymer is an olefin-vinyl ester copolymer ~~or a copolymer containing a first vinyl ester and a second vinyl ester.~~

14. (Currently Amended) The method of claim 13 wherein said copolymer is an ethylene-vinyl acetate copolymer ~~or a vinyl acetate-vinyl laurate copolymer.~~

15. (Original) The method of claim 14 wherein said copolymer is an ethylene-vinyl acetate copolymer.

16. (Currently Amended) The method of claim 13 wherein said composition comprises about 30 to 75% of said ethylene-vinyl acetate copolymer or said ~~vinyl acetate-vinyl laurate~~ copolymer, and about 25 to 70% of one or more additives.

17. (Original) The method of claim 16 wherein said one or more additives are selected from the group consisting of process aids, fillers, plasticizers, metal oxides, metal hydroxides, peroxides, coagents, antioxidants and combinations thereof.

18. (Currently Amended) The method of claim 16 wherein said composition comprises about 45 to 60% ethylene-vinyl acetate copolymer and about 40 to 55% of one or more additives comprising:

(a) about 0.8 to 2% process aid selected from the group consisting of stearic acid, stearates, polyethylene, amines, oils, organic esters, organic phosphate esters and combinations thereof;

(b) about 20 to 60% filler selected from the group consisting of carbon black, silicon dioxide, fumed silica, precipitated silica, diatomaceous earth, magnesium carbonate, magnesium silicate, aluminum silicate, ~~silicate~~ titanium dioxide, talc, mica, aluminum sulfate, calcium sulfate, graphite, wollastonite, molybdenum disulfide, clay, calcium carbonate and combinations thereof. thereof;

(c) about 3 to 15% plasticizer selected from the group consisting of hydrocarbons, glycols, aldehydes, ethers, esters, ether-esters and combinations thereof;

(d) about 0 to 10% metal oxides and/or hydroxides selected from the group consisting of zinc oxide, zinc hydroxide, magnesium oxide, magnesium hydroxide, calcium oxide, calcium hydroxide, aluminum hydroxide and combinations thereof;

(e) about 0.5 to 2% peroxide selected from the group consisting of 2,5-dimethyl-2,5-di(t-butylperoxy)hexyne-3; 2,5-dimethyl-2,5-di(t-butylperoxy)hexane; dicumyl peroxide; α,α' -bis-(t-butylperoxy)-p-diisopropylbenzene; di-t-butyl peroxide; 1,1-bis(t-butylperoxy)-3,3,3-trimethylcyclohexane; 2,4-dichlorobenzoyl peroxide; benzoyl peroxide; p-chlorobenzoyl peroxide; and combinations thereof; thereof.

(f) about 0 to 5% coagent selected from the group consisting of maleimides, triallyl cyanurate, triallyl isocyanurate, diallyl terephthalate, 1,2-vinyl polybutadiene, di- and tri-functional methacrylates and diacrylates, and combinations thereof; and

(g) about 0 to 0.3% antioxidant selected from the group consisting of Phenols, hydrocinnamates, hydroquinones, hydroquinolines, diphenylamines, mercaptobenzimidazoles, and combinations thereof.

19. (Original) The method of claim 11 further comprising adding a polymeric material to said composition wherein said polymeric material is selected from the group consisting of ethylene-propylene-diene terpolymer (EPDM), styrene-butadiene rubber (SBR), acrylonitrile-butadiene rubber (NBR), ethylene-propylene rubber (EPR), butyl rubber, cis-polybutadiene, cis-polyisoprene, polyurethane, polyamide, and mixtures thereof.

20. (New) In an automotive fluid-conveying tubular structure for conveying fluids in an automotive engine cooler, transmission oil cooler, power transmission cooler, radiator or heater, the improvement comprising employing as the tubular structure a vulcanized heat tolerant, pressure resistant, hydrocarbon fluid impermeable composition, wherein said composition comprises: an ethylene-vinyl acetate copolymer matrix having greater than about 40% vinyl acetate based upon the weight of said copolymer, said vinyl acetate copolymer matrix having incorporated therein, one or more additives selected from the group consisting of process aids, fillers, plasticizers, metal oxides, metal hydroxides, peroxides, coagents, antioxidants and combinations thereof.

21 (New) The tubular structure of claim 20 wherein said tubular structure is a radiator hose.

22. (New) The tubular structure of claim 29 wherein said tabular structure is a heater hose.